

Effects of coastal subsidence on tsunami run-up characteristics

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Abstract. A giant earthquake associated with tectonic-plate subduction often triggers subsidence of the coastal land, as well as generating a tsunami, which often forms a leading-depression N-wave. The most extreme case is that the coastal area itself is a part of the tsunami source; the 1960 Chilean tsunami, the 1964 Alaska tsunami, and the 1994 Shikotan tsunami are the examples. Using a simple geometry, a variety of the combined source conditions of the subsidence and the offshore tsunami form are examined numerically to determine the coastal effects of the tsunamis, e.g., the maximum flow velocities and the maximum tsunami run-up heights. Our simulation is extended to a hypothetical scenario associated with the rupture of Cascadia subduction off the Washington–Oregon coast.

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